

V. Notes on some Marine Turbellaria from Torres Straits and the Pacific, with a description of new species.

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Some time ago Dr. Harmer entrusted me with a small collection of Planarians made by Professor Haddon whilst in the neighbourhood of the Torres Straits during the year 1889. Shortly afterwards Dr. Gardiner kindly permitted me to describe his fine collection from the Maldives and Laccadives, and with them a few specimens from Rotuma and Funafuti, in the Pacific. My account of the Maldivian and Laccadive material has already been published [9]; the Rotuma and Funafuti specimens, together with those from the Torres Straits, are described in the present communication.

But little is at present known of the Planarian fauna of tropical seas. Since the publication of Lang's monograph of the Polycladida of the Gulf of Naples, several important memoirs dealing with this group have been published; the greatest additions have been made by Verrill for the coasts of New England [6] and by von Plehn [4].

I have not been able to find any record of Polyclads from Torres Straits. Dr. Collingwood, however, records

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a number of species from Malay seas, mostly from Singapore, but some few from the coasts of Borneo [10]. As he did not examine the anatomy of the reproductive organs of the species described by him, it is difficult in some cases to determine precisely to which of Lang's genera his specimens are to be referred, or whether they belong to distinct genera. It is, however, possible to recognise two species of *Thysanozoon*; *Typhlolepta byerleyana* I have identified from the Maldives, and have created a new genus *Pericelis* for its reception [9]. Collingwood's *Elasmodes obtusum* is probably a Leptoplanid; *Proceros* should probably be referred to *Pseudoceros*. The remaining species are a *Eurylepta* and a *Stylochopsis*. The former Lang refers to *Pseudoceros*, doubtfully, and the latter to *Prostheceræus*.

Saville Kent, in his work on the Great Barrier Reef of Australia [8], figures three species which were named for him by von Graff. These are *Pseudoceros kentii*, *Ps. dimidiatus*, and *Prostheceræus flavomaculatus*. Von Plehn has recorded species from Java and Sumatra [4]; these include two species of *Thysanoplana* (? = *Thysanozoon*) and a new genus of Leptoplanidæ with one species *Semonia maculata*, all from Java, and a very remarkable form, the type of a new family, *Diplopharynx filiformis*, from off the north coast of Sumatra. This latter belongs, however, rather to the Indian Ocean fauna.

Lastly, von Stummer-Traunfels has described three new species of *Thysanozoon* from Amboina and two from Batavia [5].

Our knowledge of the Pacific fauna is equally fragmentary. Excluding the coasts of New Zealand, Japan, China and the Philippines, from each of which one or two species are known, Lang was acquainted with only eight species from the Pacific Islands which could be definitely

referred to known families, as well as one or two problematic forms of unknown affinities. In addition to these, three or four species had been described from the Australian coasts.

Since the publication of Lang's monograph, Woodworth has described three interesting new forms from the Barrier Reef of Australia [7], whilst von Plehn [4] has recorded a number of new species from the Pacific coasts of South America, as well as the previously known *Planocera pellucida* and *Pseudoceros superbus*, the latter from the Galapagos Islands.

It is, then, not a little remarkable to find amongst the few specimens collected by Mr. Gardiner that one, from Funafuti, is apparently identical with my *Leptoplana pardalis* described from the Maldives, and that another, from Rotuma, is *Pericelis byerleyana*, referred to above.

Of the other species, *Paraplanocera rotumanensis* and *Latocestus pacificus* are the most interesting. For the former I have created a new genus, which should include the species from the Maldives that I have described as *Planocera langii* [9].

Systematic List.

Professor Haddon's collection includes the following:—

1. *Planocera*, sp.
2. *Pseudoceros haddoni*, sp. n.
3. „ *regalis* (Haddon), sp. n.

Dr. Gardiner's specimens belong to the following species:—

1. *Paraplanocera rotumanensis*, sp. n.
2. *Leptoplana pardalis*.
3. *Latocestus pacificus*, sp. n.
4. *Pericelis byerleyana*.

Sub-Order ACOTYLEA.

Family PLANOCERIDÆ.

PLANOCERA, *sp.*

One specimen from 15-20 fathoms between Dauer and Murray Island, January 6th, 1889.

Unfortunately this specimen is too immature to permit of the structure of the genital apparatus being satisfactorily studied. Consequently, although I can scarcely doubt that it is a new species, I do not venture to describe it. So far as I have been able to judge, it belongs to the genus *Planocera*. There are seven pairs of gut branches; the total length is about 16 mm. and breadth 9 mm.; the mouth opening is in the middle of the body.

PARAPLANOCERA, *gen. nov.*

Closely allied to *Planocera*, differing in the following particulars:—Male genital apparatus with a pair of vesiculæ seminales, penis long, coiled, cylindrical, its lumen lined with small, rather distant chitinous spines. In connection with the female organs a thin-walled sac runs back from the vagina and appears to function as a receptaculum seminis. Another sac, with muscular walls, runs forward from the antrum femininum, alongside the penis; this is the bursa copulatrix.

Type.—*Paraplanocera langii* (Laidlaw).

PARAPLANOCERA ROTUMANENSIS, *sp. n.*

Two specimens from Rotuma.

Total length about	-	-	- 25 mm.
„ breadth	„	-	- 15 „
Mouth opening from anterior end	15	„	
Tentacles	„	„	8 „ about 1 mm. apart.
♂ aperture from mouth	-	-	3 „
♀ „ „ male	-	-	1.5 „

Colour (no note on the living animal) white, with a small number of scattered brownish spots, due to the presence of dorsal pigment containing gut diverticula of the same character as those which I have elsewhere described for *Planocera armata* [8].

Eye-spots in two thick clusters, one at the base of either tentacle, and in four groups of brain-eyes, two on either side of the middle line between the tentacles. The hinder pair of these consist of but few spots; the anterior pair are each of them, roughly, an elongated band of eye-spots, extending in front of the tentacles. In addition to the eye-spots and the pigmented diverticula already referred to, there is a 'cloud' of minute black spots collected in the mid-dorsal region, especially over the pharynx. A similar feature was observed in *P. langii*.

Male Organs. The prostate and penis lie within the outer muscular sheath. The prostate, which is a large, roughly spherical gland, very similar to that of other species, occupies the upper proximal end of the sheath, and communicates by a muscular, rather thick-walled duct with the penis, which receives the duct at its proximal end on the ventral surface. The penis is a coiled muscular tube; at its distal end its walls become continuous with the outer sheath. Its lumen is lined with small, rather widely separated spines, which increase in size as the antrum is approached. This layer of chitinous spines is interrupted at about the middle of the length of the penis by large folds of the wall coated with a thin layer of chitin. These folds have caused tearing of the sections, and consequently it is not possible to describe their exact arrangement. They are precisely similar in character to the folds described in the penis of *P. langii*. The antrum masculinum is very small, lined with secretory epithelium.

Immediately after it leaves the prostate, the duct

running from this gland to the penis is joined by the common duct running from the vesiculae seminales. These organs are merely the ends of the vasa differentia, slightly dilated, and supplied with a thin coating of muscle fibres.

The outer sheath is very thin and consists simply of a few circular fibres; the muscle wall of the penis consists of circular and diagonal fibres. There are apparently no retractor muscles, but at its distal end the penis, as already stated, comes into contact with the outer sheath. This contact is most pronounced, and continued furthest back from the aperture, on the ventral side.

Female Organs. These resemble in detail those of *P. langii*. The aperture leads into a wide muscular cavity from which a large muscular bursa copulatrix runs forward, after first bending to the right, alongside the penis just outside the outer muscular sheath. From the dorsal part of the cavity of the antrum femininum a short narrow duct runs back, receiving the openings of the uteri on either side, then, turning ventral-wards, it widens into a large elongated sac which has non-muscular walls and runs for some distance backwards. This sac I call the receptaculum seminis. Owing to the preservation of the tissues being rather poor, I cannot determine accurately the characters of the epithelium lining the walls of these chambers, but, so far as I can see, it appears precisely similar to that of *P. langii*. Both the bursa copulatrix (which has its inner walls much folded) and the receptaculum are filled with dense masses of spermatozoa.

This species is readily distinguished from *P. langii* by the possession of dorsal pigment-containing gut diverticula, as well as by the arrangement of the eye-spots.

The most noteworthy feature presented by species of this genus is the occurrence of the remarkable bursa

copulatrix, which cannot be homologized with that found in the true *Planocera*. In fact, not only is it impossible to derive the type of structure found in the female apparatus of *Paraplanocera* from the type found in *Planocera*, but it further seems impossible to suppose that they can have been derived from a common primitive type. On the other hand, the fairly close resemblance that exists between the no less complicated male organs of the same two genera obliges us to assume that a real relationship exists between them.

Amongst other Polyclads, a bursa copulatrix similar to that found in *Paraplanocera* only exists in *Eustylochus*, a new genus founded by Verrill for *Stylochus ellipticus* (Gerard) [6]. Verrill believes that a similar organ exists in *Stylochoplana maculata* (Quat.), for which species he proposes a new genus, *Heterostylochus*, but an examination of de Quatrefage's account and beautiful figure of the anatomy of this species makes it clear to me that the median forwardly-directed vesicle of this species, which lies over the penis, is rather to be compared to the vagina and accessory vesicle (which in *Paraplanocera* I term the receptaculum seminis), as the oviducts open into it. Consequently, this organ is quite distinct from the bursa copulatrix of *Paraplanocera* and from the organ which Verrill regards as a "spermatheca," or seminal receptacle, in *Eustylochus*. The latter genus can be readily distinguished from *Paraplanocera* by its styliform penis and by the possession of marginal eyes.

Family LEPTOPLANIDÆ.

LEPTOPLANA PARDALIS, Laidlaw.

Five specimens from Funafuti.

Family LATOCESTIDÆ, nov.

Von Plehn [4] has not, I believe, commented on the

striking resemblance between the genital apparatus of the two genera *Latocestus* and *Acelis*, which she refers respectively to the families Cestoplanidæ and Leptoplanidæ.

I believe that the resemblances are strong enough to outweigh the striking external differences in shape, etc., and indicate a connection between the two genera. The possession of a pair of vesiculæ seminales is exceptional in the Leptoplanidæ and the typical *Cestoplana* have only one. Further, I do not know of any Leptoplanid in which the prostate gland is segmented off so distinctly from the sperm duct, whilst in *Cestoplana* the prostate cells line part of the lumen of the duct. In fact, I believe that the relationship between *Cestoplana* and certain Leptoplanids is distinctly closer than between *Cestoplana* and *Latocestus*. Accordingly, I propose to constitute an independent family to receive these two genera, *Latocestis* and *Acelis*.

LATOCESTUS PACIFICUS, *sp. n.*

Two specimens, both immature, from Rotuma. An interesting new species, very distinct from *L. atlanticus*, the only member of the genus hitherto described. Unfortunately, the gonads are undeveloped, and it is consequently impossible to ascertain whether the same peculiarity obtains with regard to the position of the testes that was noticed by von Plehn [4] in *L. atlanticus*.

The terminal parts of the ducts are sufficiently developed to show that this species is closely allied to *L. atlanticus*.

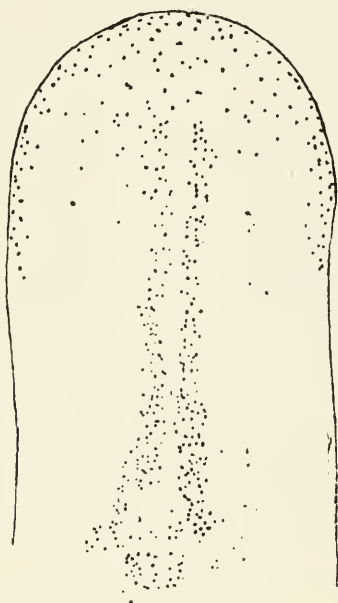
Total length about - - 12 mm.?

„ breadth „ - - 2.5 „

Brain from anterior margin - 4 „

The mouth opening and sexual apertures lie close to the hinder end of the body. The anterior margin of the

body is rounded, the arrangement of the numerous eye-spots being shown in the accompanying figure.



Anterior end of *Latocestus pacificus*, sp. n., showing the arrangement of the eye-spots. ($\times 14$.)

This genus is probably fairly abundant in tropical seas. I am inclined to believe that the species I have described as *Cestoplana? maldivensis* [9] should be referred to it, but an examination, by sections, of the single specimen known is unfortunately impossible. I have also an undescribed species belonging to this genus from Penang, very distinct from either of the others.

Sub-Order *COTYLEA*.

Family PERICELIDÆ.

PERICELIS BYERLEYANA (Coll.).

A single large specimen from Rotuma, indistinguishable, so far as I can discover, from the Maldivian specimens.

Family PSEUDOCERIDÆ.

PSEUDOCEROS REGALIS, Haddon (in MS.), *sp. n.*

A single specimen from Mēr Reef, January 8th, 1889.

Length about - - - - - 17 mm.

Breadth „ - - - - - 11 „

Mouth opening from anterior margin - 6 „

♂ aperture behind mouth - - - 1·5 „

♀ „ „ ♂ - - - 1 „

Sucker behind ♀ aperture - - - 1·5 „

Brain-eyes from anterior margin - - 1·5 „

Colour a rich brick-red, becoming intense toward the margin, which is lined with a very fine black line. As in the following species, the tentacles are small, and the eye-spots difficult to distinguish owing to the dense pigmentation. The cluster of brain-eyes is very small. Colour of the under surface dull yellow. Penis single. Evidently somewhat closely allied to *Ps. kentii*, von Graff [8].

PSEUDOCEROS HADDONI, *sp. n.**Planaria nigrocincta*, Haddon, in MS. (nom. preocc.)

One specimen, immature, Mēr Reef, January 12th, 1889.

Length about - - - - - 17 mm.

Breadth „ - - - - - 12 „

Mouth opening from anterior margin 5 „

Sucker from mouth - - - 4 „

The marginal band is about 1·5 mm. deep.

Colour dull orange-yellow, with a fairly broad marginal band running completely round the body, black. This black band is edged on its outer side by a very narrow yellow border. Tentacles small; brain-eyes few, in a minute circular cluster; pharynx large, much folded.

In addition to the foregoing species, Prof. Haddon

collected a *Pseudoceros* of larger size (about 30 mm. in length) entirely black, and evidently allied to specimens from the Maldives referred by me to *Ps. buskii* (Coll.) and *Ps. flavomarginatus*. It resembles still more closely Lang's figure of *Ps. velutinus*, var. *violacea* of Schmarda [2], from the coasts of Ceylon. There is also a small specimen of a black, yellow-margined species from Rotuma, and others from Zanzibar are in Mr. Crossland's collection, which I hope to describe shortly. I cannot feel certain of the identity of these two specimens with any described form, but, as these black *Pseudoceros* are evidently numerous in tropical seas and possibly very variable, I cannot undertake at present to name either of these specimens. This group of black species is very difficult to examine owing to the dense pigmentation. Probably *Ps. dimidiatus* [8] belongs to the same group.

Von Plehn [4] has found *Ps. superbus* in the Pacific, off the Galapagos Islands.

There remain two species, one from Rotuma and one from Torres Straits, the former represented by a single imperfect specimen, the latter by two individuals too immature to admit of a satisfactory diagnosis. Both species have the typical folded pharynx of the Pseudoceridæ and are probably referable to the genus *Pseudoceros*, but I believe that under the circumstances it is advisable to leave them undescribed. There are, in addition to these, one or two other species from the Torres Straits which are unfortunately so macerated that no evidence as to their position is obtainable.

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